

### Amendments to the Claims

Please cancel claims 1-16 without prejudice.

The following listing of claims will replace all prior versions and/or listing of claims in the application:

#### Listing of Claims:

1-16. (cancelled)

17. (currently amended): A method of forming a catalyst for polymerization and copolymerization of ethylene comprising:

preparing a magnesium solution by contact-reacting a halogenated magnesium compound with alcohol;

reacting ~~said~~the magnesium solution with an ester compound ~~having comprising~~ at least one hydroxy group, or a phosphorus compound and a silicon compound ~~having comprising~~ alkoxy groups, and then producing a solid component by adding a mixture of a titanium compound and a silicon compound thereto; and

reacting ~~said~~the solid component with an aluminum compound, and then reacting the same with a titanium compound, or a titanium compound and a vanadium compound.

18. (currently amended): The method of claim 17, wherein the ester compound ~~containing comprising~~ at least one hydroxy group comprises an unsaturated aliphatic acid ester ~~having comprising~~ at least one hydroxy group, an aliphatic monoester or polyester ~~having comprising~~ at least one hydroxy group, an aromatic ester ~~having comprising~~ at least one hydroxy group, or an alicyclic ester ~~having comprising~~ at least one hydroxy group.

19. (currently amended): The method of claim 17, wherein the phosphorus compound comprises phosphorus trichloride, phosphorus tribromide, diethylchlorophosphite,

diphenylchlorophosphite, diethylbromophosphite,  
~~diphenylbromophosphite~~~~diphenylbromophospite~~, dimethylchlorophosphite,  
phenylchlorophosphite, trimethylphosphite, triethylphosphite, tri-n-butylphosphite,  
trioctylphosphite, tridecylphosphite, triphenylphosphite, triethylphosphate, tri-n-butylphosphate,  
or triphenylphosphate.

20. (currently amended): The method of claim 17, wherein the silicon compound  
~~having comprising~~ alkoxy groups comprises dimethyldimethoxysilane, dimethyldiethoxysilane,  
diphenyldimethoxysilane, methylphenylmethoxysilane, diphenyldiethoxysilane,  
ethyltrimethoxysilane, vinyltrimethoxysilane, methyltrimethoxysilane, phenyltrimethoxysilane,  
methyltriethoxysilane, ethyltriethoxysilane, vinyltriethoxysilane, butyltriethoxysilane,  
phenyltriethoxysilane, ethyltriisopropoxysilane, vinyltributoxysilane, ethylsilicate, butylsilicate,  
or methyltriaryloxysilane.

21. (currently amended): The method of claim 17, wherein the titanium compound is  
represented by a general formula of  $Ti(OR)_aX_{4-a}$ ,  ~~$Ti(OR)_aX_{4-a}$~~ , where R is a hydrocarbon group,  
X ~~for~~is a halogen atom, and ~~a for a~~a is a natural number of  $0 \leq a \leq 4$  ~~from 0 to 4~~; and wherein the  
silicon compound is represented by a general formula of  $R_nSiCl_{4-n}$ ,  ~~$R_nSiCl_{4-n}$~~ , where R is  
hydrogen, an aryl, alkoxy, haloalkyl or alkyl group having 1-10 carbon atoms, or a halosilylalkyl  
or halosilyl group having 1-8 carbon atoms, ~~and n and is n for~~n is a natural number of  $0 \leq n \leq 4$  ~~from 0~~  
to 4.

22. (currently amended): The method of claim 17, wherein the titanium compound comprises  
a 4-halogenated titanium, a 3-halogenated alkoxytitanium, a 2-halogenated alkoxytitanium, or a  
~~tetraalkoxy-titanium~~tetraalkoxytitanium, and wherein the silicon compound is silicon  
tetrachloride, a trichlorosilane, a dichlorosilane, or a monochlorosilane.

23. (currently amended): The method of claim 17, wherein ~~said the~~the titanium compound is  
titanium tetrachloride, and ~~said the~~the silicon compound is silicon tetrachloride.

24. (currently amended): The method of claim 17, wherein the amount of the mixture of ~~said the~~ titanium compound and ~~said the~~ silicon compound is 0.1-200 mol per mole of ~~said the~~ halogenated magnesium compound, and the molar ratio of ~~said the~~ titanium compound to ~~said the~~ silicon compound in the mixture is 0.05-0.95.

25. (currently amended): The method of claim 17, wherein the aluminum compound comprises a trialkylaluminum ~~having comprising~~ an alkyl group of 1-6 carbon atoms, an aluminum compound ~~having comprising~~ one or more halogen atoms, or mixtures thereof.

26. (currently amended): The method of claim 17, wherein the vanadium compound is a compound with a maximum atomic valence of 4, or a maximum atomic valence of VO of a vanadyl group of 3, having a general formula of  $V(OR^4)_{4-n}X_n$ , or  $VO(OR^4)_{3-m}X_m$ ,  $V(OR^4)_{4-n}X_n$ , or  $VO(OR^4)_{3-m}X_m$ , where  $R^4$  is an aliphatic or aromatic hydrocarbon group having ~~1-14 carbons~~ 1-14 carbons, or  $COR^5$ , where  $R^5$  is an aliphatic or aromatic hydrocarbon group having ~~1-14 carbons~~ 1-14 carbons, wherein X is Cl, Br or I; ~~n is an~~ n is an integer of 1-4, or the ratio thereof; and ~~m is an~~ m is an integer of 0-3, or the ratio thereof.

27. (currently amended): The method of claim 17, wherein the ester compound ~~containing~~ comprising at least one hydroxy group comprises 2-hydroxy ethylacrylate, 2-hydroxy ethylmethacrylate, 2-hydroxy propylacrylate, 2-hydroxy propylmethacrylate, 4-hydroxy butylacrylate, pentaerithritol tri-acrylate, 2-hydroxy ethyl acetate, methyl 3-hydroxy butylate, ethyl 3-hydroxy butylate, methyl 2-hydroxy isobutylate, ethyl 2-hydroxy isobutylate, methyl-3-hydroxy-2-methyl propionate, 2,2-dimethyl-3-hydroxy propionate, ethyl-6-hydroxy hexanoate, t-butyl-2-hydroxy isobutylate, diethyl-3-hydroxy glutarate, ethyl-lactate, isopropyl lactate, butyl-isobutyl lactate, isobutyl lactate, ethyl mandelate, dimethyl ethyl tartrate, ethyl tartrate, dibutyl tartrate, diethyl citrate, triethyl citrate, ethyl-2-hydroxy-caproate, diethyl *bis*-(hydroxymethyl) malonate, 2-hydroxy ethyl benzoate, 2-hydroxy ethyl salicylate, methyl-4-(hydroxy methyl) benzoate, methyl-4-hydroxy benzoate, ethyl-3-hydroxy benzoate, 4-methyl salicylate, ethyl salicylate, phenyl salicylate, propyl-4-hydroxy benzoate, phenyl-3-hydroxy naphthanoate,

monoethylene glycol monobenzoate, diethylene glycol monobenzoate, triethylene glycol monobenzoate, or hydroxy butyl-lactone.

28. (currently amended): The method of claim 17, wherein the phosphorus compound is a compound expressed by  $PX_aR^1_b(OR^2)_c$  or  $POX_dR^3_e(OR^4)_f$ ,  ~~$PX_aR^1_b(OR^2)_e$ , or  $POX_dR^3_e(OR^4)_f$~~ , where X is a halogen atom; and  $R^1$ ,  $R^2$ ,  $R^3$  or  $R^4$  is a hydrocarbon of an alkyl, or alkenyl or aryl group, having 1-20 carbon atoms, each of which can be same or different from one another, with  $a + b + c = 3$ ,  $0 \leq a \leq 3$ ,  $0 \leq b \leq 3$ ,  $0 \leq c \leq 3$ ,  $d + e + f = 3$ ,  $0 \leq d \leq 3$ ,  $0 \leq e \leq 3$ , and  $0 \leq f \leq 3$ .  ~~$a + b + e = 3$ ,  $0 \leq a \leq 3$ ,  $0 \leq b \leq 3$ ,  $0 \leq e \leq 3$ ,  $d + e + f = 3$ ,  $0 \leq d \leq 3$ ,  $0 \leq e \leq 3$ , and  $0 \leq f \leq 3$ .~~

29. (currently amended): The method of claim 17, wherein the silicon compound ~~having comprising~~ alkoxy groups is a compound of a general formula of  $R_nSi(OR)_{4-n}$ ,  ~~$R_nSi(OR)_4$~~ , where R is a hydrocarbon group having 1-12 carbon atoms, and n is a natural number from 1-3 ~~of 1-3~~.

30. (currently amended): The method of claim 17, wherein the titanium compound comprises  $TiCl_4$ ,  $TiBr_4$ , ~~and  $TiI_4$~~ ,  $Ti(OCH_3)Cl_3$ ,  $Ti(OC_2H_5)Cl_3$ ,  $Ti(OC_2H_5)Br_3$ ,  $Ti(O(i-C_4H_9))Br_3$ ,  $Ti(OCH_3)_2Cl_2$ ,  $Ti(OC_2H_5)_2Cl_2$ ,  $Ti(O(i-C_4H_9))_2Cl_2$ ,  $Ti(OC_2H_5)_2Br_2$ ,  $Ti(OCH_3)_4$ ,  $Ti(OC_2H_5)_4$ , or  $Ti(OC_4H_9)_4$ .

31. (previously presented): The method of claim 17, wherein the silicon compound comprises silicon tetrachloride, methyltrichlorosilane, ethyltrichlorosilane, phenyltrichlorosilane, dimethylchlorosilane, diethyldichlorosilane, diphenyldichlorosilane, methylphenyldichlorosilane, or trimethylchlorosilane.

32. (previously presented): The method of claim 17, wherein the aluminum compound comprises triethylaluminum, triisobutylaluminum, ethylaluminum dichloride, diethylaluminum chloride, ethylaluminum sesquichloride, or mixtures thereof.